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Twenty Years of PROGRESS in Agriculture through RESEARCH, 1935-1954

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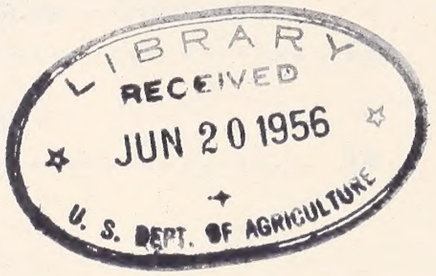

United States Department of Agriculture

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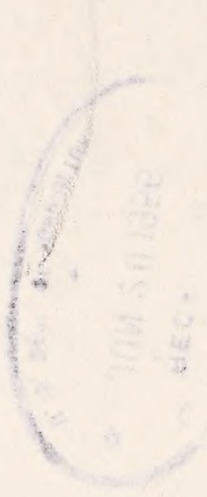
U. S. Agricultural Research Service.



- INDEX -

The distinct improvement in farm crops that has taken place during the past 20 years has been greatly assisted by the work of plant breeders who have been developing better and new varieties for farm use. The changeover is so great that by 1954 about 70% of all crop acreage was planted to varieties that were not even in existence commercially in 1935. In some cases, varietal shifts have occurred two or three times.

In Iowa, for example, farmers have made a complete changeover twice since 1941 in the varieties of oats they grow, so as to keep ahead of diseases causing heavy loss. A third major switch is now under way.

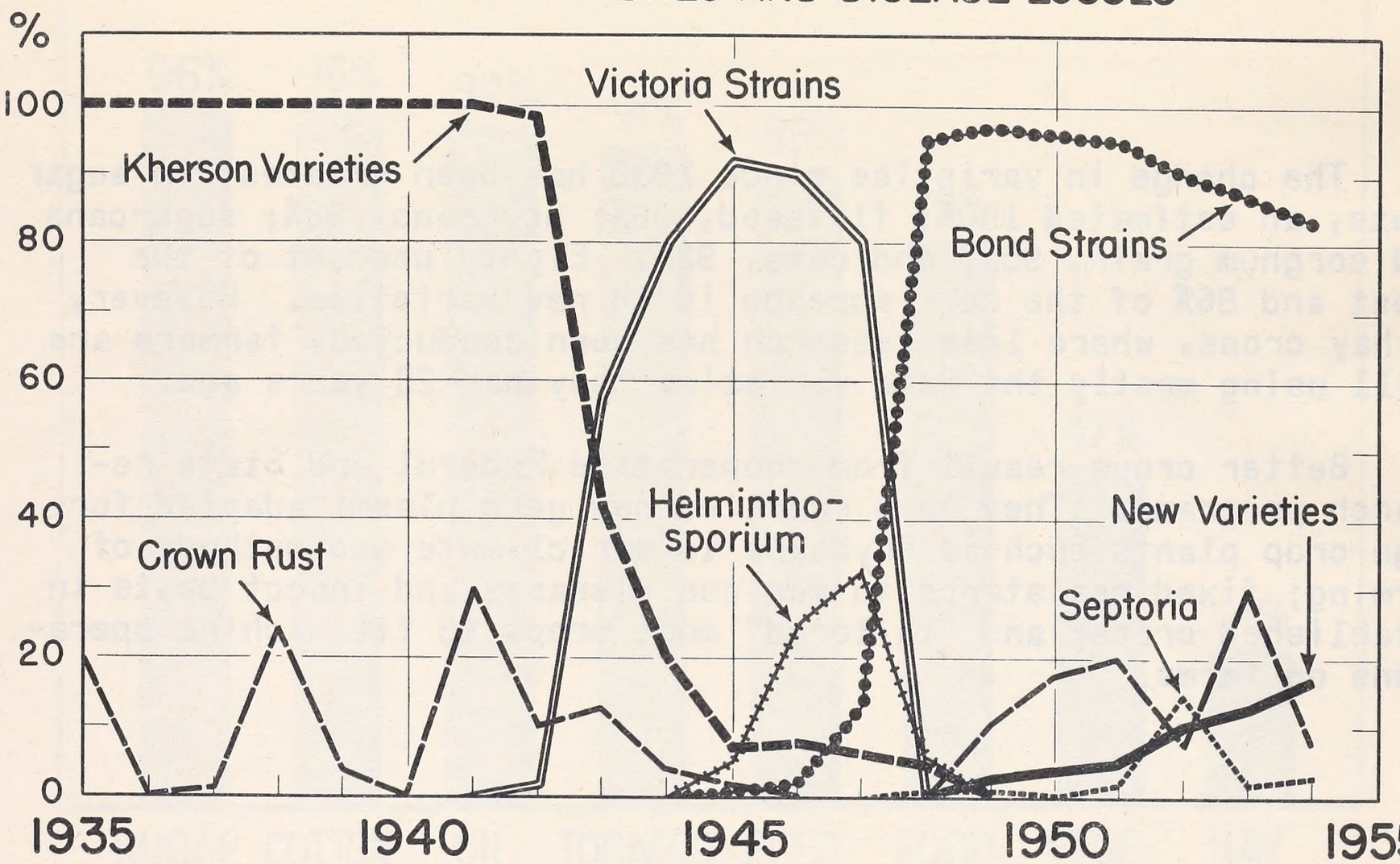
Iowa growers realize the importance of improved varieties. It took only 4 years for crown-rust resistant Victoria strains to displace Kherson oats; but when improved Bond strains resistant to root and crown rot came out, they took over in 3 years. The present change is slower, but new varieties such as Clintland already occupy one acre in five.

Plant breeders, however, are racing against time to develop still better varieties growers will need as other disease organisms build up. If they win, growers can expect substantial dividends.

1954 COMPARED WITH 1935

IOWA OAT PRODUCTION

CHANGES IN VARIETIES AND DISEASE LOSSES *



* *VARIETIES - % OF PLANTED ACRES; LOSSES - % OF PRODUCTION*

U.S. DEPARTMENT OF AGRICULTURE

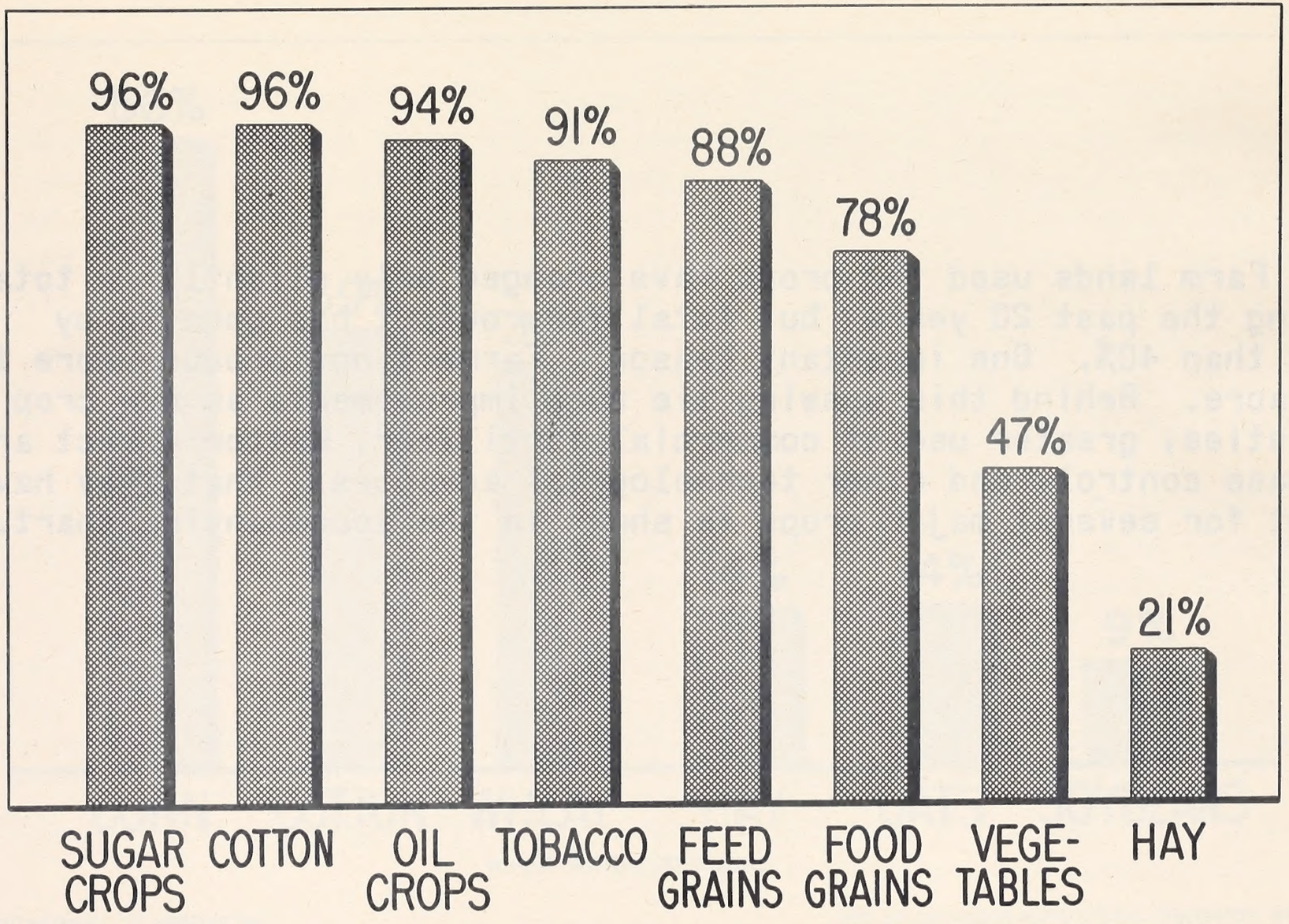
NEG. 55 (10) - 2001 AGRICULTURAL RESEARCH SERVICE

The change in varieties since 1935 has been greatest in sugar beets, an estimated 100%; flaxseed, 99%; soybeans, 98%; sugarcane and sorghum grain, 95%; and oats, 92%. Eighty percent of the wheat and 86% of the corn acreage is in new varieties. However, in hay crops, where less research has been conducted, farmers are still using mostly the same varieties they had 20 years ago.

Better crops result from cooperative Federal and State research programs. They have supplied new germ plasm; adapted foreign crop plants such as soybeans to our climate and methods of farming; fixed resistance to various diseases and insect pests in established crops; and "tailored" most crops to fit machine operations on farms.

VARIETAL CHANGES IN MAJOR CROPS

PERCENT CHANGE, 1954 FROM 1935



U.S. DEPARTMENT OF AGRICULTURE

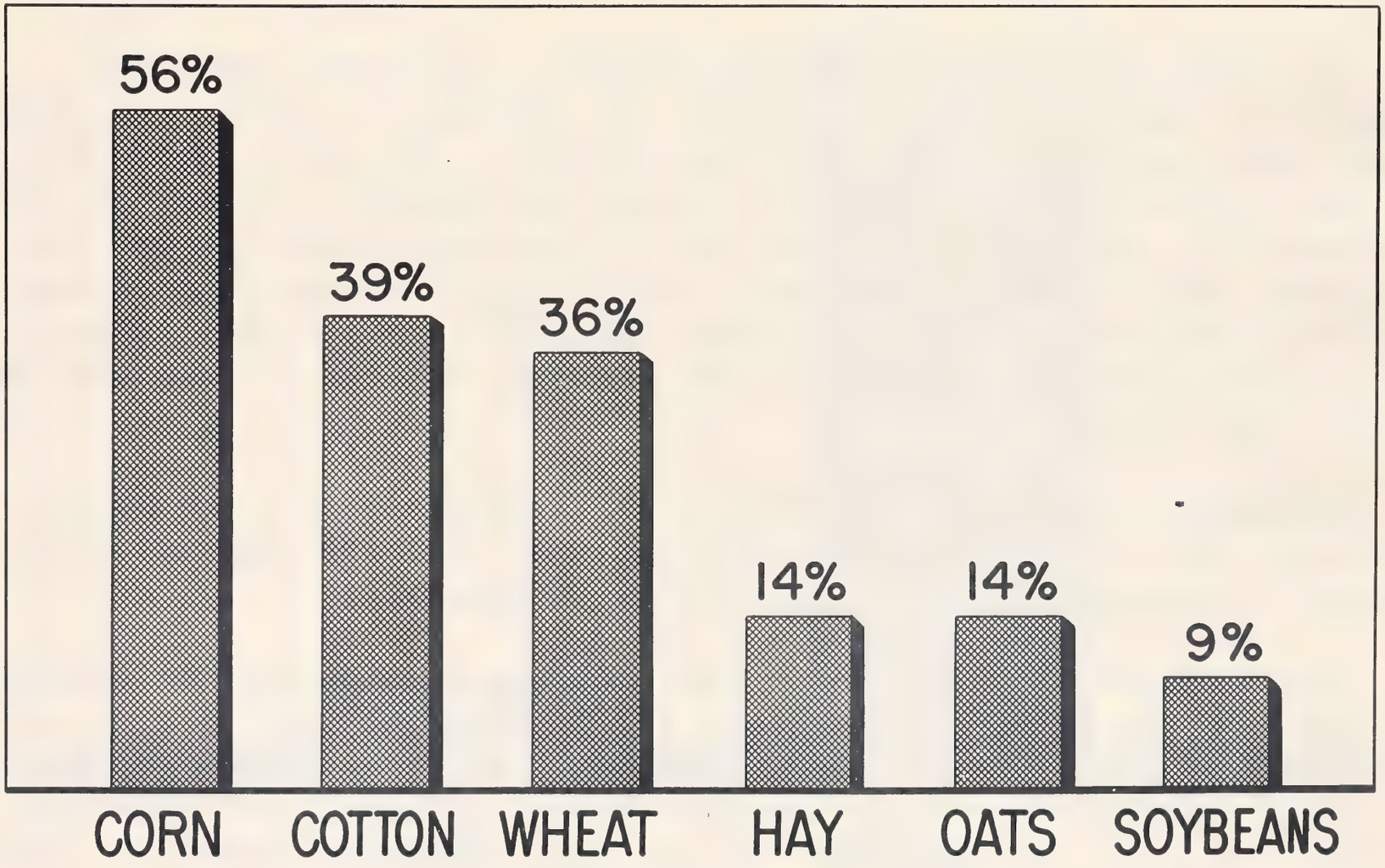
NEG. 55 (10)-2002 AGRICULTURAL RESEARCH SERVICE

Farm lands used for crops have changed only slightly in total during the past 20 years, but total farm output has gone up by more than 40%. One important reason: Farmers now produce more to the acre. Behind this upswing lie such improvements as new crop varieties, greater use of commercial fertilizer, better insect and disease control, and other technological advances. What they have meant for several major crops is shown in the accompanying chart.

FOR SELECTED CROPS

CHANGES IN CROP YIELDS*

PERCENT CHANGE, 1952-54 FROM 1935-39



* *PER HARVESTED ACRE*

U.S. DEPARTMENT OF AGRICULTURE

NEG. 55 (10)-2003 AGRICULTURAL RESEARCH SERVICE

The soybean has come of age as a farm crop with hundreds of food and industrial uses -- and research has made it so.

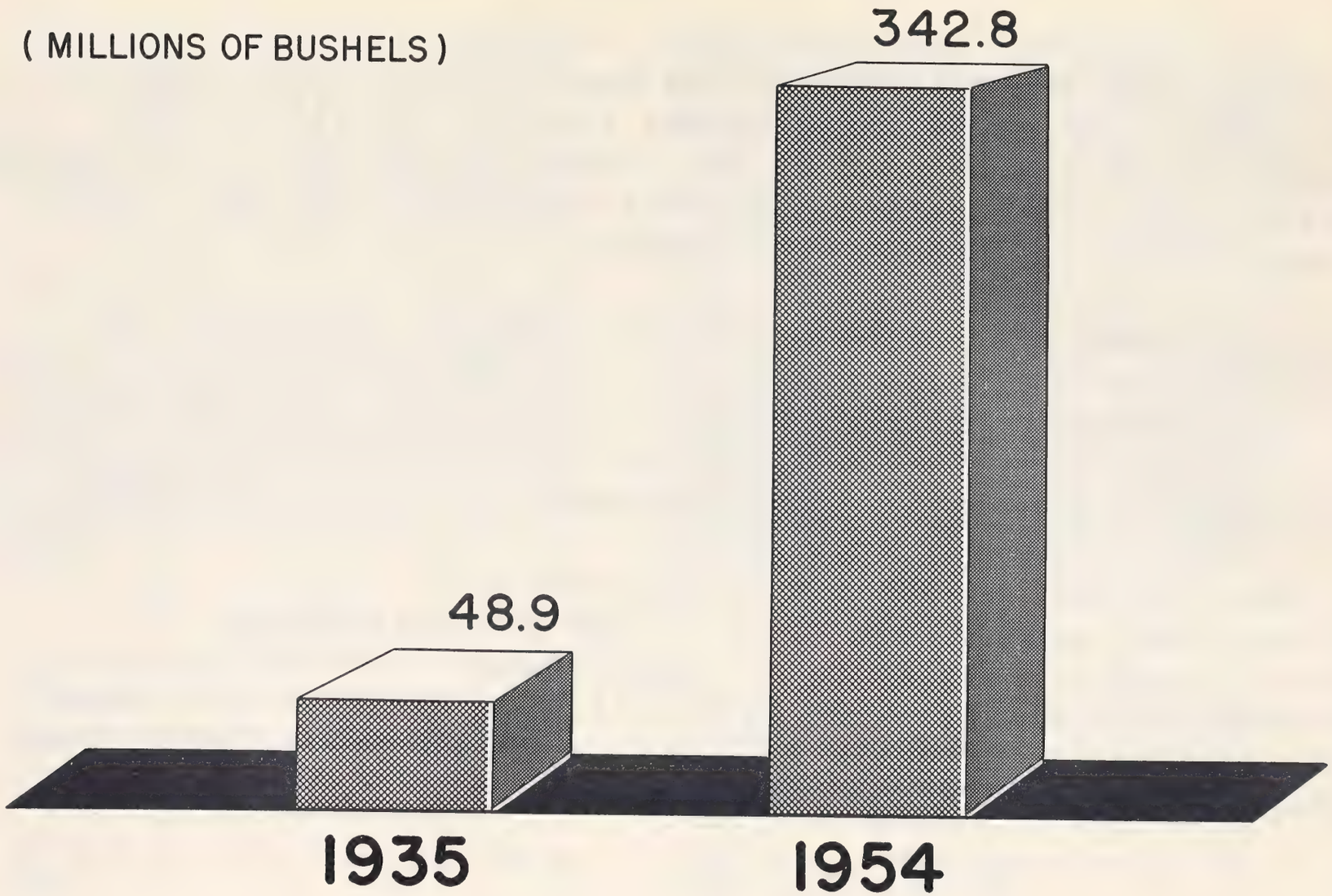
In 1954 more than 17 million acres of soybeans were harvested for beans -- almost 6 times the acreage of 1935. In many areas where soybeans had never been grown a few years ago, the crop was a profitable source of income to farmers. Research had provided the necessary information on seeding, inoculation, fertilizing, and liming. Even more significant, research produced hybrid varieties that yield higher (by 20%); resist shattering and lodging, and mature within the growing seasons of various new production areas.

Soybeans today provide 70% of all vegetable oils in margarine and 54% of the vegetable shortenings, because agricultural chemical research increased stability of the oil.

For industrial uses, research workers have opened an outlet for 221 million pounds of soybean oil in conventional drying oil products. They have also developed entirely new industrial products from polymerized fatty acids, special resins, and plasticizers. In use with plastics alone, the potential market is 200 million pounds of soybean oil a year.

SOYBEAN PRODUCTION

1954 COMPARED WITH 1935



U.S. DEPARTMENT OF AGRICULTURE

NEG. 55 (10)-2004 AGRICULTURAL RESEARCH SERVICE

Since 1935 the grasshopper has been reduced from a panic-causing destroyer to an insect enemy that can be effectively handled. Greater knowledge of the insect gained through research, a better means for locating potential outbreaks, and more skillful ways of control brought this about.

Now a 5-man crew using up-to-date methods in one day can kill as many as 5 billion grasshoppers on the western range. The most remote breeding areas are within reach, and treatment need not be renewed for many years. Early insecticide sprays against young 'hoppers give control on croplands.

Nevertheless, a severe outbreak--30 to 35 'hoppers per square yard--can destroy the feed value of western grasslands. This calls for constant vigilance and preparedness against emergency outbreaks. Cooperative work is at all times necessary to make certain that we never again will suffer grasshopper plagues such as those of the 1870's and 1930's.

1954 COMPARED WITH 1935

GRASSHOPPER CONTROL

1935

20 pounds of bait - a mixture of sodium arsenite, bran, and sawdust - applied broadcast over an acre gave 60 to 80% control. Certain species were not affected. 150 acres was a good day's work.

1954

Two oz. of poison in a gallon of oil applied per acre as an atomized spray gives 95 to 97% control of all species. Multi-engined aircraft will treat 8,000 to 10,000 acres each day. Over-all per-acre costs are 50% less than in 1935.

U.S. DEPARTMENT OF AGRICULTURE

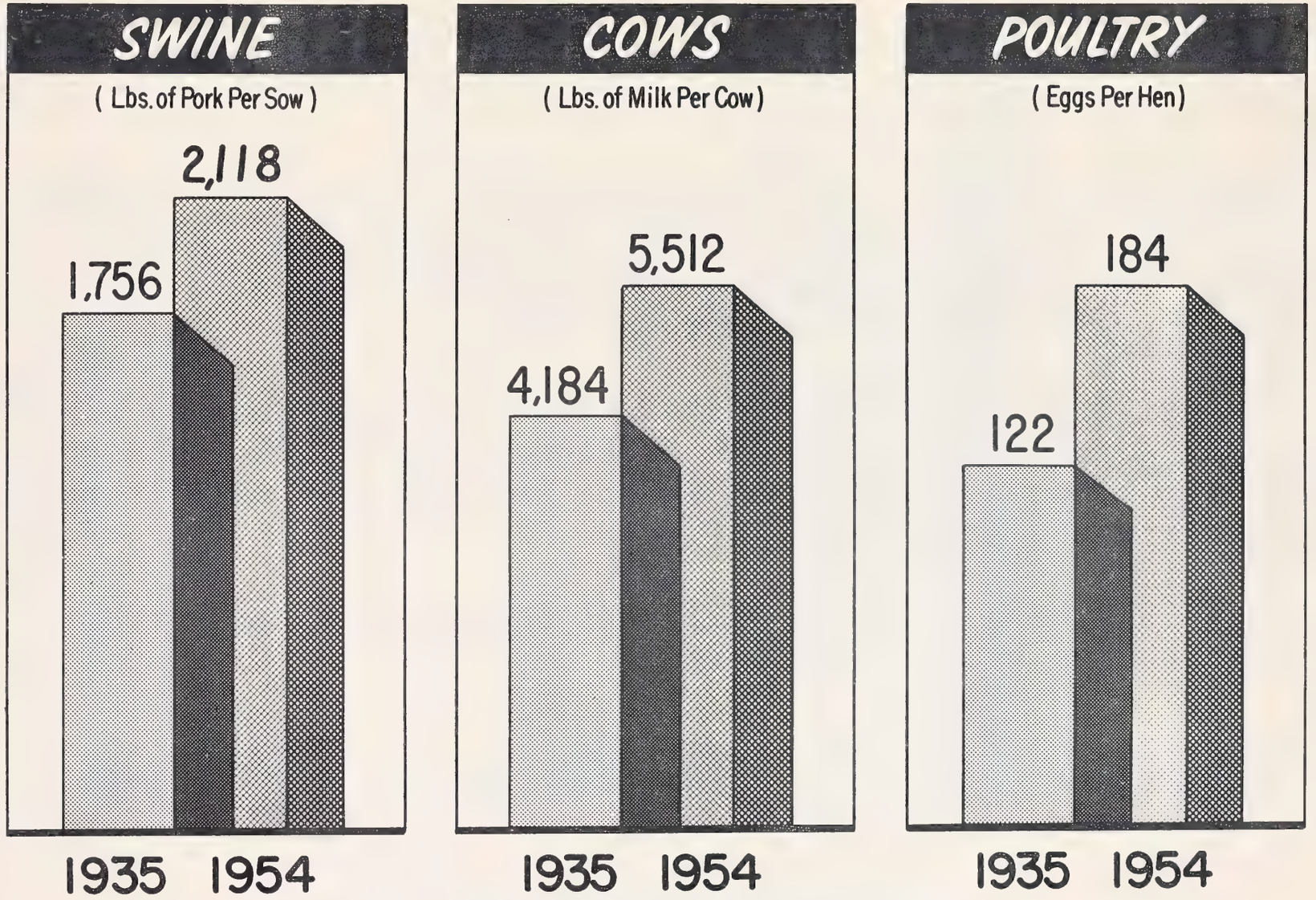
NEG. 55 (10) - 2 008 AGRICULTURAL RESEARCH SERVICE

Heavier feeding, better balanced rations, use of improved animals, better sanitation and improved livestock management in general helped to increase livestock production per breeding unit by 25% since 1935.

Most conspicuous was the increase in egg production--51% in 20 years. Milk production per cow went up 32%, pork per sow 20%.

1954 COMPARED WITH 1935

OUTPUT PER ANIMAL



SOURCE OF DATA: AGRICULTURAL MARKETING SERVICE

U.S. DEPARTMENT OF AGRICULTURE

NEG. 55 (10)-2009 AGRICULTURAL RESEARCH SERVICE

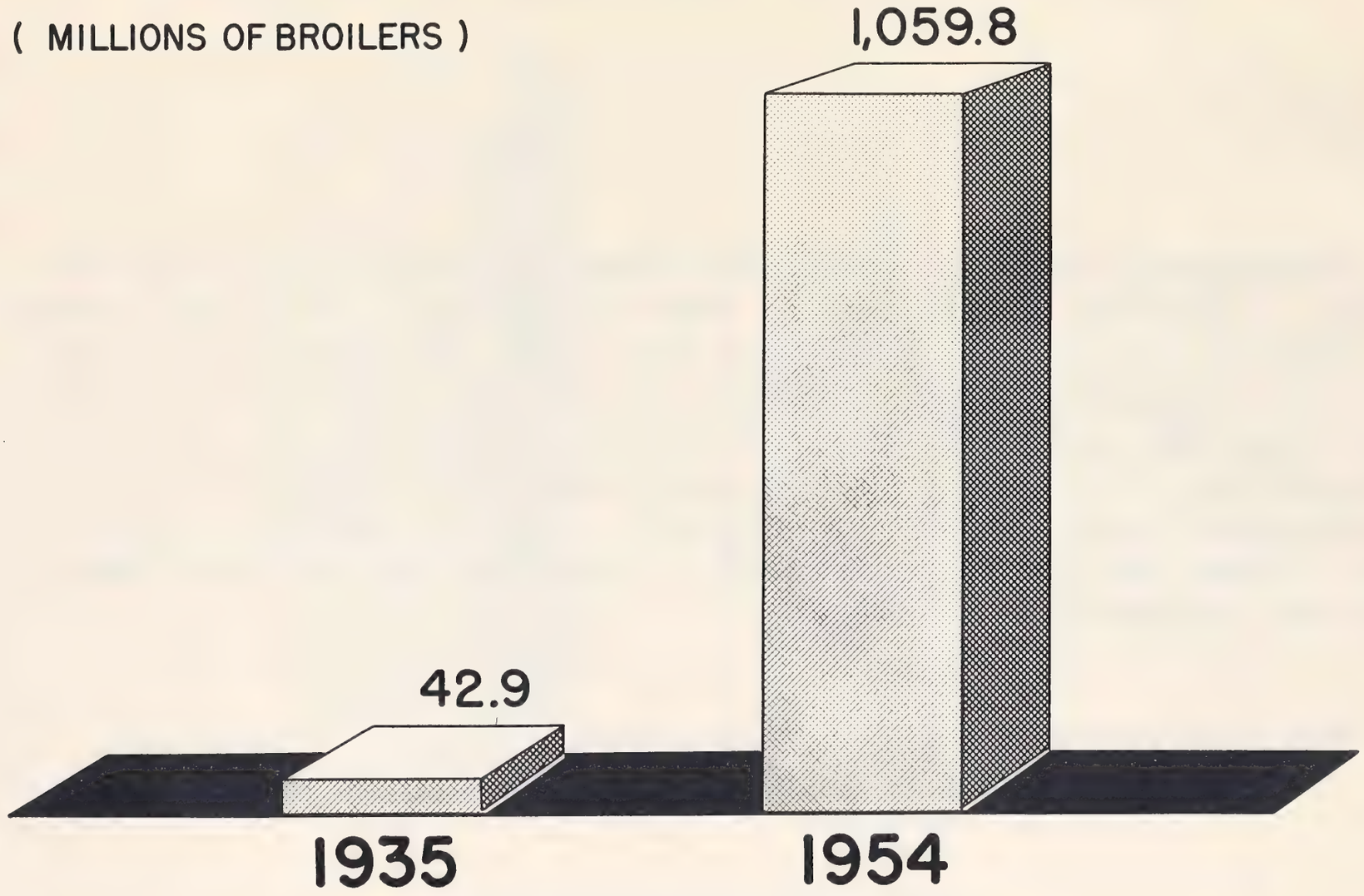
From a fringe farm operation worth $24.5 million to farmers 20 years ago, broiler production has mushroomed into a highly commercialized business grossing $800 million and providing 20 pounds of poultry meat per person in 1954.

In less than two decades, production was increased by almost 2400%, while output per man-hour of labor jumped 162%. The production cycle has been cut by a third, and 42% more meat is being obtained from the same amount of feed.

This is a record few agricultural enterprises can match. And research has made it possible.

1954 COMPARED WITH 1935

COMMERCIAL BROILER PRODUCTION



SOURCE OF DATA: AGRICULTURAL MARKETING SERVICE

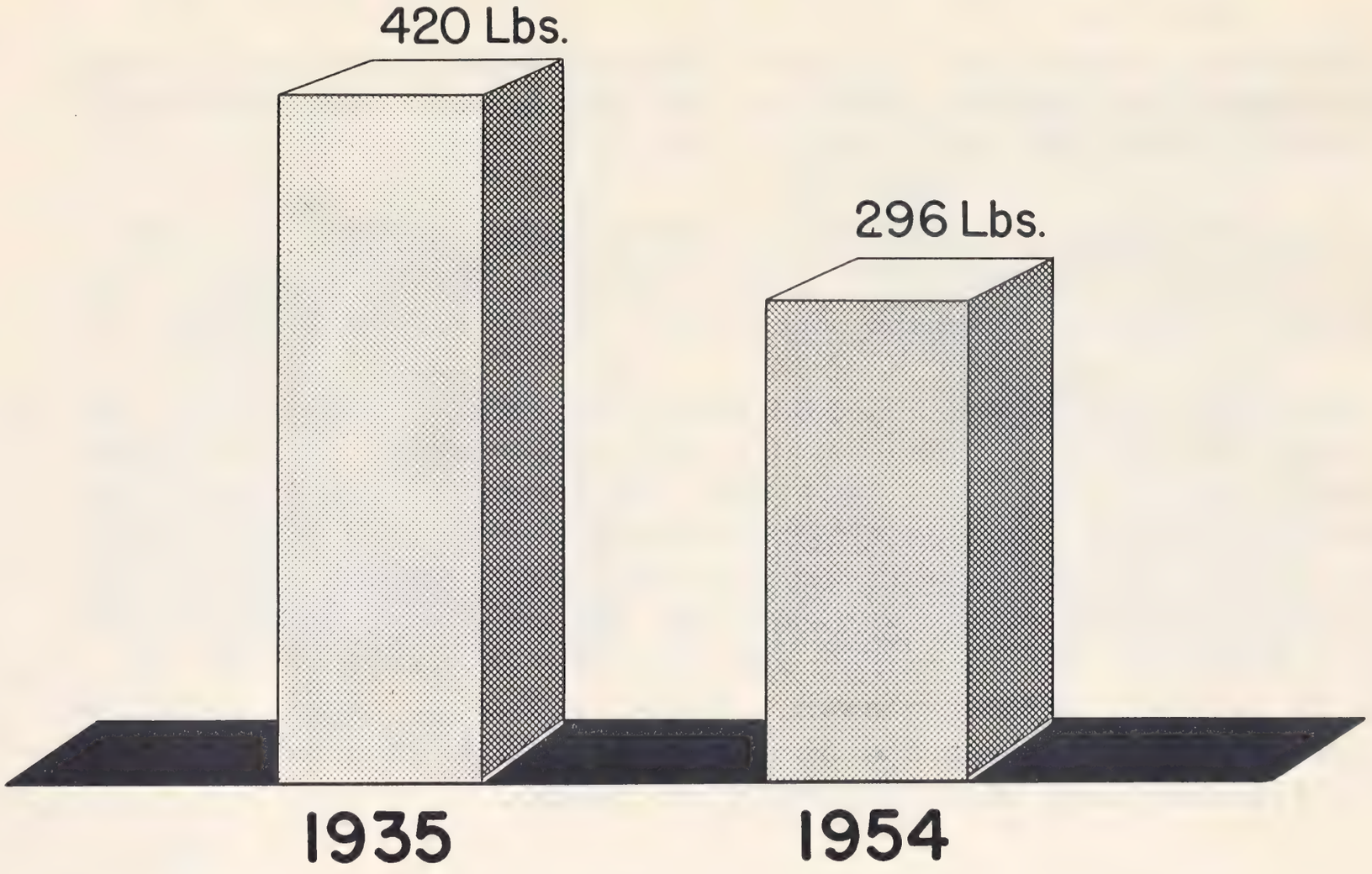
U.S. DEPARTMENT OF AGRICULTURE

NEG. 55 (10) - 2005 AGRICULTURAL RESEARCH SERVICE

Advances in broiler production have largely paralleled advances in poultry nutrition and feed efficiency. A grower today can produce 100 pounds of poultry meat with 124 fewer pounds of feed than needed in 1935, a reduction of 30%. Yet this feeding efficiency has helped to open still bigger markets for farm products used in feeds. Twenty years ago, only 115,000 tons of manufactured feed was fed to broilers. Today, nearly 4 million tons of feed are required--or 10% of the total mixed feed manufactured in the United States.

1954 COMPARED WITH 1935

CONCENTRATE FEED USED TO PRODUCE 100 LBS. OF BROILERS



U.S. DEPARTMENT OF AGRICULTURE

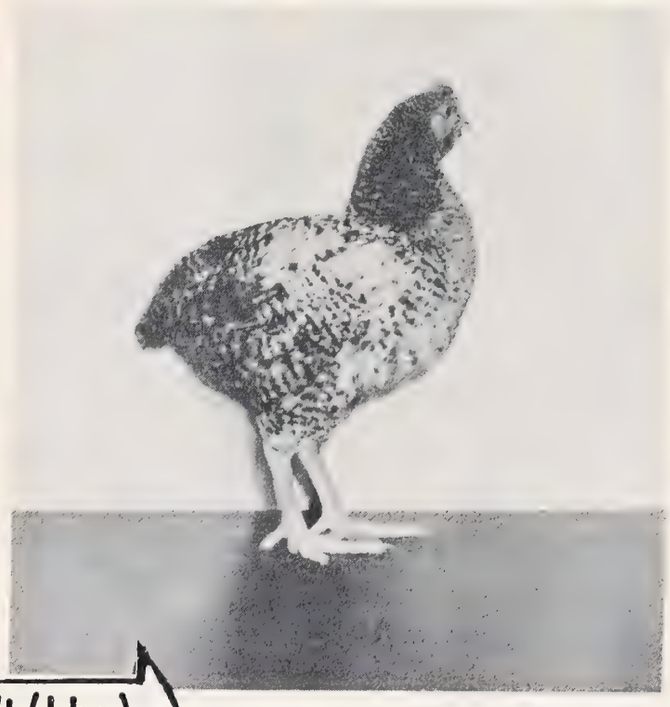
NEG. 55 (10)-2 006 AGRICULTURAL RESEARCH SERVICE

Broiler production is one of agriculture's most efficient enterprises, and hybrid vigor in poultry breeds and new knowledge about nutrition have made it so.

The "chicken of tomorrow" is here today in the form of barred crosses that have the light-colored feathers preferred in poultry markets and make efficient use of modern feeds.

Research has added so much new information on poultry nutrition that the 1954 ration gives a half-pound more poultry meat on a half-pound less feed than did the 1935 ration. Important research findings include the discovery and use of riboflavin as the first B-complex vitamin supplementing poultry feed; the discovery of Vitamin B_{12} and methods for its manufacture from soybean meal and corn sugars; and the use of antibiotics in feeds to produce better growth. More recently, other additives such as arsenical compounds and animal fats have improved both feed efficiency and manufacturing of feeds.

ADVANCES IN BROILER BREEDING AND NUTRITION RESEARCH *

	FED 1935 RATION	FED 1954 RATION
		
Av. Wt. (Lbs.) at 9 Weeks	2.3	2.8
Lbs. of Feed Per Lb. of Gain	3.1	2.6

* *DATA BASED ON EXPERIMENTS ON CROSSBREEDS AT BELTSVILLE, MARYLAND*

U.S. DEPARTMENT OF AGRICULTURE

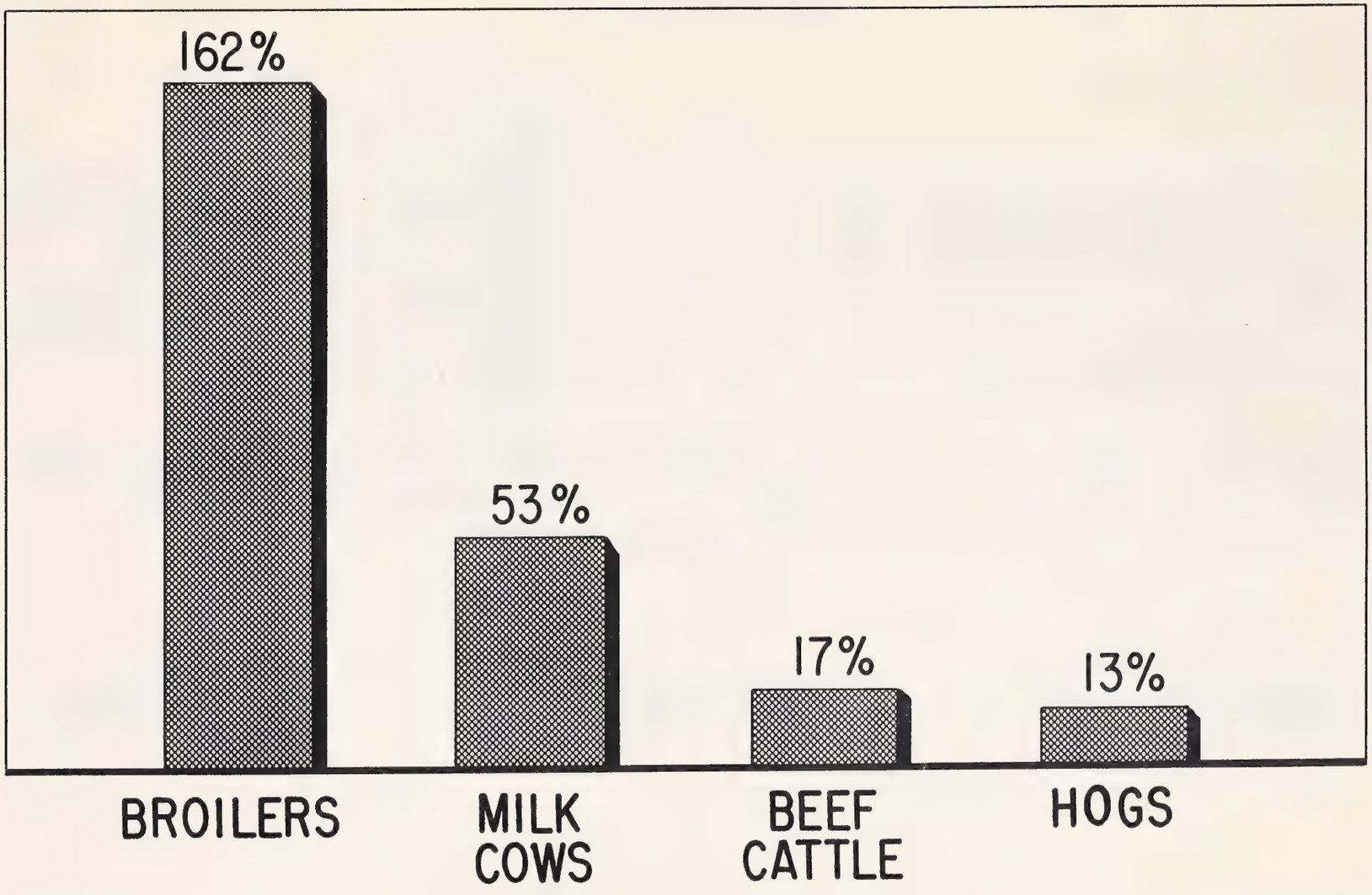
NEG. 55 (10) – 2 011 AGRICULTURAL RESEARCH SERVICE

One important way a farmer can help offset higher costs is to increase his production per hour of work. Farm output per man-hour of labor has gone up 85%--but most of the increase comes from greater labor efficiency in producing crops, which has more than doubled since 1935. Productivity per man-hour of work with livestock has gone up only 54% in that time.

Even in livestock enterprises, however, the improvement has been quite uneven as shown by the chart. Automatic equipment, greater nutrition efficiency, reduction by half of losses from diseases, and a 30% shortening of time needed to produce a 3-pound broiler have raised labor efficiency in producing broilers well above other livestock enterprises. On the other hand, little progress has been made in reducing hand work on beef cattle and hogs. Beef cattle and hog raisers haven't had the lift that milking machines and greater production per cow have given to dairymen. Beef cattle and hogs are fed and handled much the same as they were 20 years ago.

PERCENT CHANGE, 1952-54 FROM 1935-39

INCREASE IN PRODUCTION PER MAN-HOUR OF SELECTED LIVESTOCK ENTERPRISES



U.S. DEPARTMENT OF AGRICULTURE

NEG. 55 (10) - 2007 AGRICULTURAL RESEARCH SERVICE

Success in reducing tuberculosis infection among cattle from 1.5% in 1935 to .11% in 1954 means a saving of well over $15 million a year to cattle owners and at the same time it reduces hazards to the human family, especially from bone and glandular tuberculosis that once was common in both young and old.

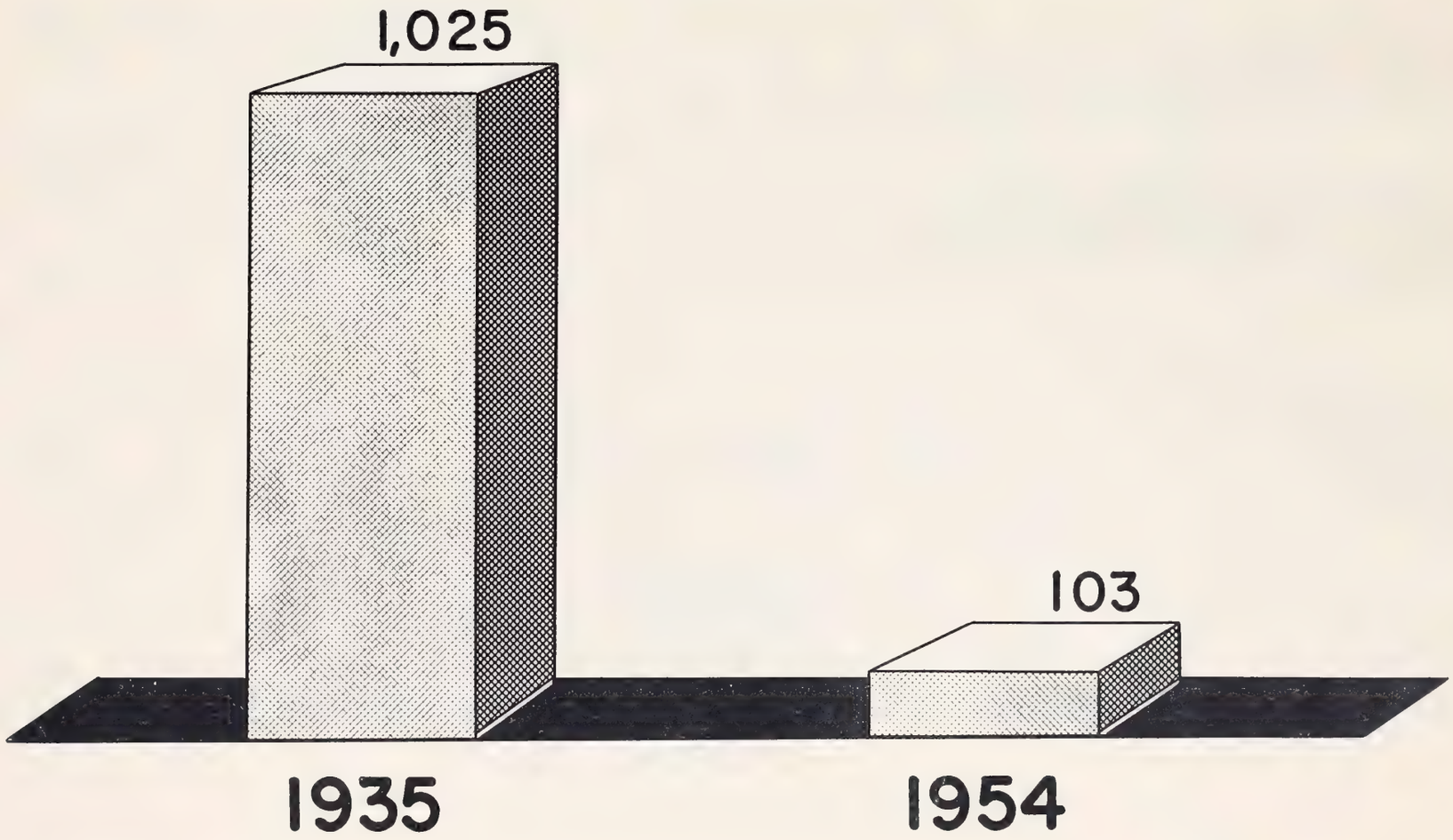
Progress has been greatly accelerated by research that has improved testing techniques, which in turn have facilitated detection and eradication of diseased animals.

1954 COMPARED WITH 1935

TUBERCULOSIS

NUMBER OF INFECTED ANIMALS *

IN THOUSANDS



* *CALCULATED*

U.S. DEPARTMENT OF AGRICULTURE

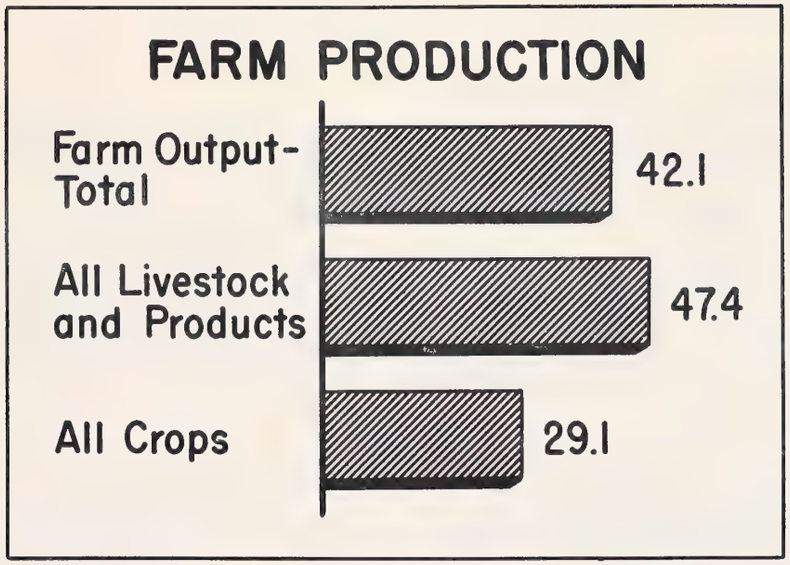
NEG. 55 (10)-2 014 AGRICULTURAL RESEARCH SERVICE

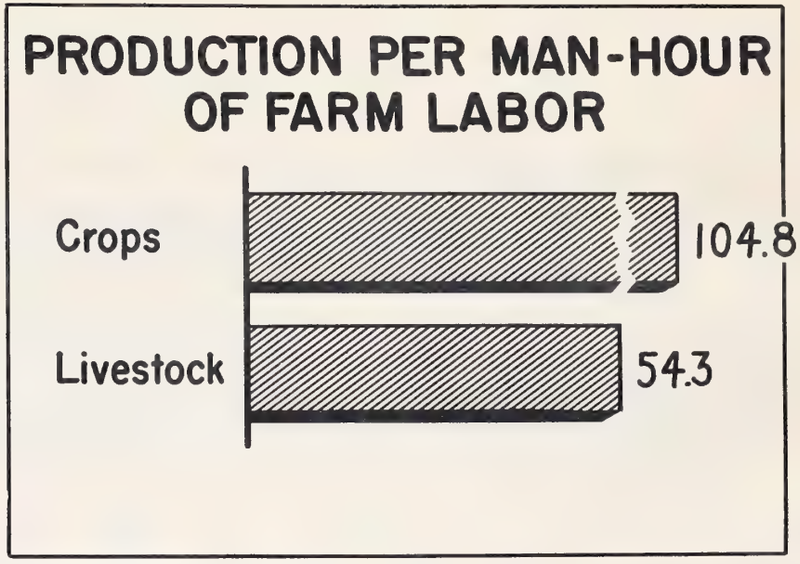
While population was increasing by 25% within the last 20 years, total farm output was going up 42%, partly because of stepped-up demands during World War II and the post-war years. Fully one-fifth of the increased output can be attributed to reduction in the number of horses and mules, which freed millions of acres, once needed for the support of work animals, for the production of marketable commodities.

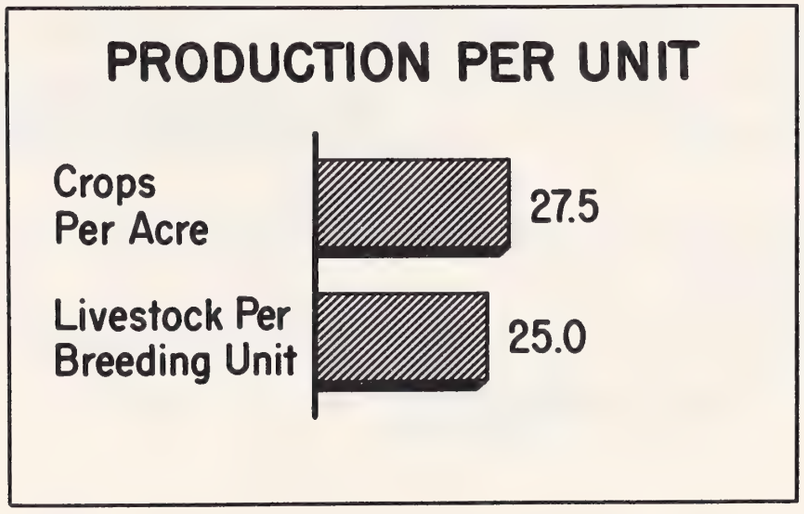
Meanwhile, because of mechanization and various technological advances initiated through research, the hours of work needed to produce our agricultural commodities decreased. The hours per worker, however, remain almost as high as 20 years ago, in large part because time needed for livestock chores has been reduced only slightly. Nevertheless, production per man-hour of farm labor has increased substantially, as well as production of crops per acre and of livestock per breeding unit.

PERCENT CHANGE, 1952-54 FROM 1935-39

AGRICULTURAL PRODUCTIVITY







U.S. DEPARTMENT OF AGRICULTURE

NEG. 55 (10) - 2012 AGRICULTURAL RESEARCH SERVICE

In the past 20 years there has been little change in total pounds of food consumed per person, but there has been a great change in type and quality of foods eaten, as shown by the chart. Discoveries made through agricultural research, including nutritional studies, have contributed greatly to these changes.

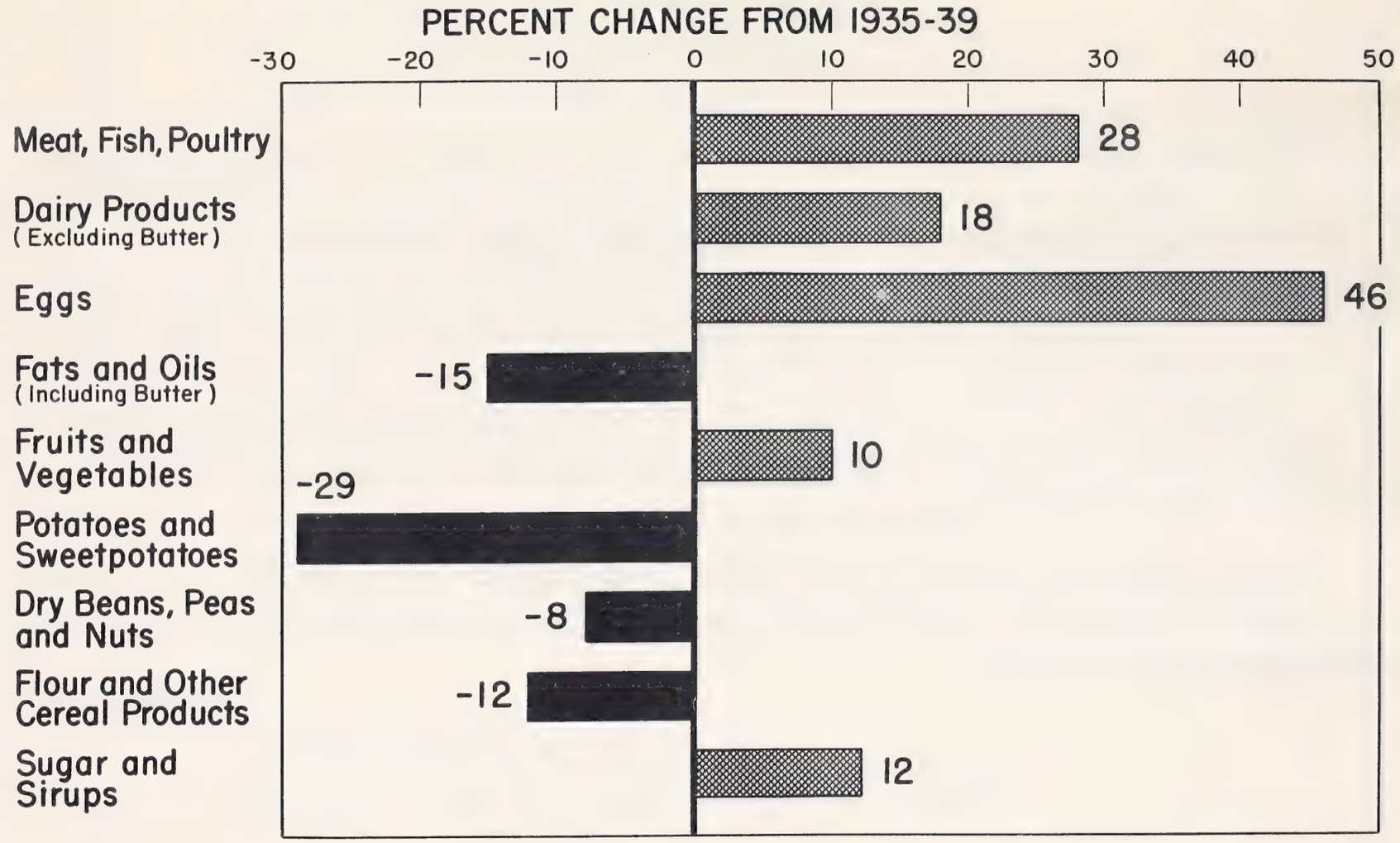
Consumption of protein foods has increased considerably; that of fats and oils has gone down. We eat more fruits and vegetables, thereby increasing our vitamin and mineral intake; and consume less carbohydrates. The enrichment of bread, flour, and cereal products has raised the nutritive value of our diets despite reduced consumption of these products.

Great advances made in producing, processing, transporting, and marketing contribute to the changes in our eating habits. Higher incomes permit more consumers to purchase better foods and more of the services associated with food.

1954 COMPARED WITH 1935-39

CHANGES IN OUR EATING HABITS

PER CAPITA CONSUMPTION OF MAJOR FOOD GROUPS



SOURCE OF DATA: AGRICULTURAL MARKETING SERVICE

U.S. DEPARTMENT OF AGRICULTURE

NEG. 55 (10)-2010 AGRICULTURAL RESEARCH SERVICE

Although agricultural progress in the past 20 years has been rapid, the demand for research has not diminished. In fact, it has increased. Farmers today are in critical need of more research that will help them adjust their farming operations as soon as possible and strike a proper balance in farm production; operate more efficiently; and obtain a fair return on capital and labor. Marketing margins must be reduced where possible. At the same time, food and fiber requirements of a rapidly increasing population must be met.

These needs urgently call for immediate strengthening of the agricultural research programs that can be most productive in the present-day situation.

BUT WE STILL HAVE PROBLEMS

IN CROPS AND SOILS

- Soils continue to lose productive capacity
- Insects and diseases always threaten
- Farmers need new crops that pay

IN LIVESTOCK

- Livestock labor still is 75% hand work
- Diseases and parasites take $2 billion a year
- Profitable ways of shifting to livestock farming are needed

IN UTILIZATION AND MARKETING

- Competition is increasing from synthetics
- New uses are urgently needed for farm products
- Greater marketing efficiency is vital
- Millions need better nutrition

IN GENERAL

- Farming efficiency must be increased
- Farm output must be geared to population growth

U. S. DEPARTMENT OF AGRICULTURE NEG. 56(1)-2015 AGRICULTURAL RESEARCH SERVICE